CLAIMS

1. A process for producing a crude oil having lowered unsaponifiable matter content and/or ester-type sterol content and comprising a highly unsaturated fatty acid as a constituent fatty acid, characterized in that a microorganism capable of producing a fat or oil comprising an unsaturated fatty acid as a constituent fatty acid is cultured in a medium containing a nitrogen source concentration of 2 to 15% within a culture tank equipped with an agitation impeller satisfying the requirement that the ratio of the diameter of agitation impeller (= d) to the inner diameter of the culture tank (= D) is d/D = 0.30 to 0.6.

2. The process according to claim 1, wherein the ratio of the diameter of agitation impeller (= d) to the inner diameter of the culture tank (= D) is d/D = 0.34 to 0.6.

3. The process according to claim 1 or 2, wherein the nitrogen source contains a nitrogen source which has been sterilized at a pH of not more than 5.

4. A process for producing a refined fat or oil, characterized by comprising refining the crude oil produced by the process according to any one of claims 1 to 3.

5. The process for producing a crude oil comprising a highly unsaturated fatty acid having lowered unsaponifiable matter content and/or ester-type sterol content as a constituent fatty acid according to any one of claims 1 to 3, or the process for producing a refined fat or oil according to claim 4, characterized in that not less than 70% of the fat or oil comprising said highly unsaturated fatty acid as the constituent fatty acid is accounted for by a triglyceride.

6. The process according to any one of claims 1 to 5, wherein the highly unsaturated fatty acid constituting the fat or oil is γ-linolenic acid (18:3 ω6), dihomo-γ-

linolenic acid (20:3 ω6), arachidonic acid (20:4 ω6), 7,10,13,16-docosatetraenoic acid (22:4 ω6), 4,7,10,13,16-docosapentaenoic acid (22:5 ω6), α-linolenic acid (18:3 ω3), 6,9,12,15- octadecatetraenoic acid (18:4 ω3), 8,11,14,17-eicosatetraenoic acid (20:4 ω3), eicosapentaenoic acid (20:5 ω3), 7,10,13,16,19-docosapentaenoic acid (22:5 ω3), 4,7,10,13,16,19-docosahexaenoic acid (22:6 ω3), 6,9-octadecadienoic acid (18:2 ω9), 8,11-eicosadienoic acid (20:2 ω9), or 5,8,11-eicosatrienoic acid (Mead acid: 20:3 ω9) or a combination of two or more of them.

7. The process according to any one of claims 1 to 6, wherein the microorganism is one belonging to the genus Mortierella, Conidiobolus, Pythium, Phytophthora, Penicillium, Cladosporium, Mucor, Fusarium, Aspergillus, Rhodotorula, Entomophthora, Echinosporangium, or Saprolegnia.

8. The process according to any one of claims 1 to 7, wherein said microorganism is one belonging to the genus Mortierella, subgenus Mortierella.

9. The process according to claim 8, wherein the microorganism belonging to the subgenus Mortierella is the species alpina belonging to the genus Mortierella.

10. A crude oil characterized by having an unsaponifiable matter content of not more than 2.2% by weight produced by the process according to any one of claims 1 to 9.

11. A refined fat or oil produced by refining the crude oil according to claim 10.

12. A crude oil characterized by having an ester-type sterol content of not more than 1.0% by weight produced by the process according to any one of claims 1 to 9.

13. A refined fat or oil produced by refining the

crude oil according to claim 12.

14. A crude oil comprising a fat or oil having lowered unsaponifiable matter content and/or ester-type sterol content comprising, as a constituent fatty acid, a highly unsaturated fatty acid, characterized in that the unsaponifiable matter content of the fat or oil is not more than 2.2% by weight.

15. A refined fat or oil produced by refining the crude oil according to claim 14.

16. A crude oil comprising a fat or oil having lowered unsaponifiable matter content and/or ester-type sterol content comprising, as a constituent fatty acid, a highly unsaturated fatty acid, characterized in that the ester-type sterol content of the fat or oil is not more than 1.0% by weight.

17. A refined fat or oil produced by refining the crude oil according to claim 16.

18. A general food and drink, a functional food, a nutrition supplement, a formula for premature babies, a formula for mature babies, a food for infants, a food for expectant and nursing mothers, or a food for aged persons, comprising the crude oil and/or the refined fat or oil according to any one of claims 10 to 17 incorporated therein.

19. A therapeutic nutrition food comprising the crude oil and/or the refined fat or oil according to any one of claims 10 to 17 incorporated therein optionally together with a neutral carrier suitable for oral, intrarectal or parenteral administration.

20. A food for animals or fishes, comprising the crude oil and/or the refined fat or oil according to any one of claims 10 to 17 incorporated therein.

21. A pharmaceutical composition, comprising the crude oil and/or the refined fat or oil according to any one of claims 10 to 17 incorporated therein.

22. A pharmaceutical composition prepared by using the crude oil and/or the refined fat or oil according to

any one of claims 10 to 17 as a raw material.